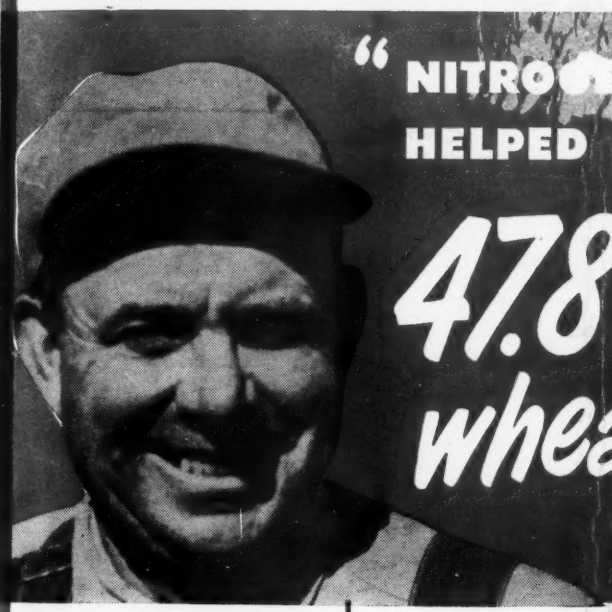
The American FERTILIZER



"NITROGEN TOP-DRESSING HELPED ME TO PRODUCE *47.8 bushels of wheat per acre!*"

—says **HOYT BADGETT**
Winner of 1949 North Carolina Wheat Improvement Contest

ARCADIAN*, the American Nitrate of Soda

•

A-N-L* Brand Fertilizer Compound

•

Sulphate of Ammonia

•

Barrett Standard Nitrogen Solutions

•

Barrett Standard Anhydrous Ammonia

THE ELEMENT THAT MAKES PLANTS GROW

Hoyt Badgett, Surry County, North Carolina, has reason to smile. His 1949 championship yield of 47.8 bushels per acre is the best crop ever produced in the North Carolina Wheat Improvement Contest.

When he seeded Atlas 66 wheat which he grows for certification, Mr. Badgett applied 400 pounds of 3-12-6 fertilizer per acre. And, on February 10, he top-dressed with 170 pounds of A-N-L* Brand Fertilizer Compound per acre.

Mr. Badgett's record-breaking yield is featured in Barrett advertisements appearing in January issues of farm magazines. Barrett advertising not only *sells* nitrogen top-dressing, it also *sells* mixed fertilizers. Thus Barrett advertising helps you to promote a balanced fertilizer program.

Barrett NITROGEN

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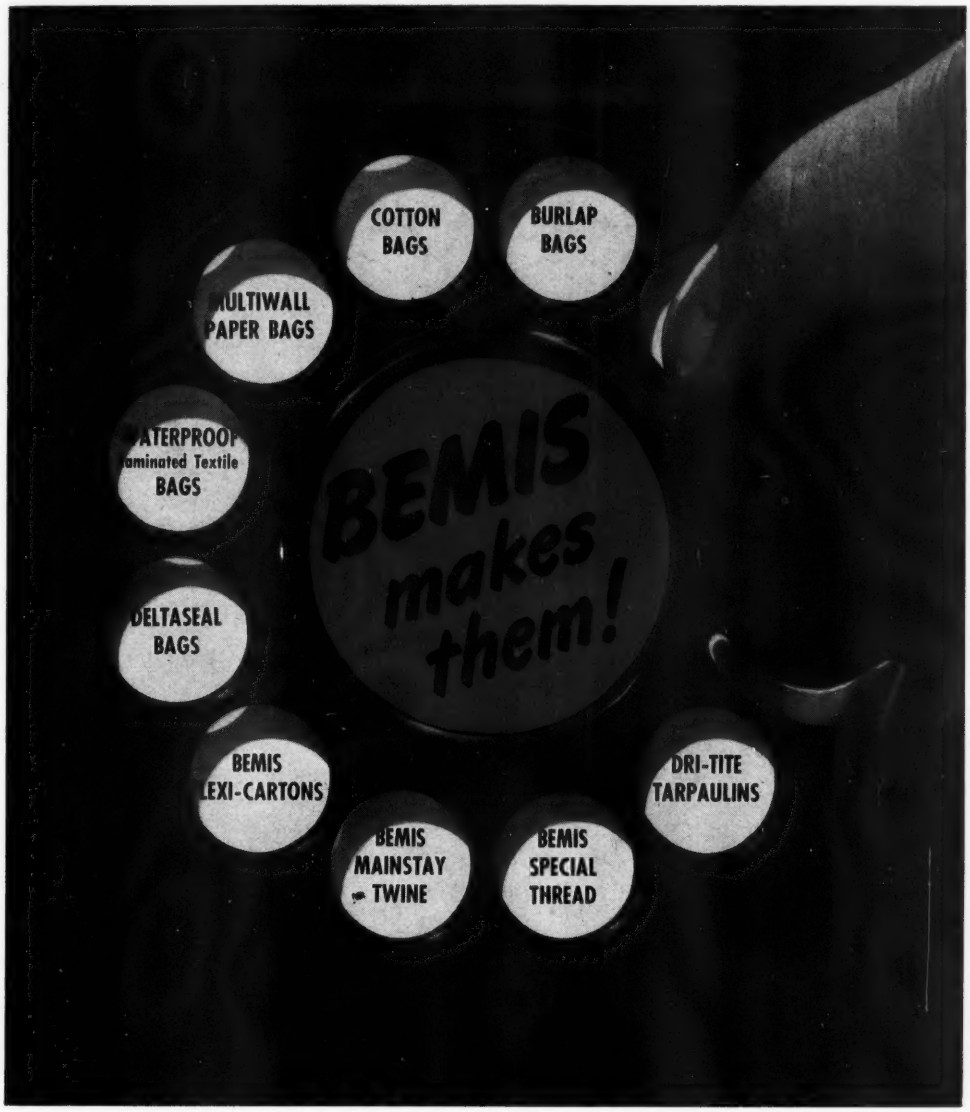

If we made just one kind of bag, naturally we would try to sell you that one kind. But we make good bags of *all kinds*, so our best interest lies in helping you get the kind of bag that serves you best. And if you want guidance in deciding which is best for your needs, our experience will help you there, too.

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THE strategic factory locations of The American Agricultural Chemical Company, as shown on the accompanying map, assure prompt, dependable service for the complete line of products listed below.

We manufacture all grades of Commercial Fertilizers, Superphosphate, Agrinite Tankage, Bone Black, Bone Black Pigments (Cosmic Black), Bone Ash, Bone Oil, Dicalcium Phosphate, Monocalcium Phosphate, Gelatin, Agricultural Insecticides (including Pyrox, Arsenate of Lead, Calcium Arsenate, etc.), Trisodium and Disodium Phosphate, Phosphorus, Phosphoric Acid, Sulphuric Acid, Ammonium Carbonate, Ammonium Fluosilicate, Magnesium Fluosilicate, Potassium Fluosilicate, Phosphorus Pentasulphide, Phosphorus Sesquisulphide (lump), Zinc Fluosilicate, Salt Cake; and we are importers and/or dealers in Nitrate of Soda, Cyanamid, Potash Salts, Sulphate of Ammonia, Raw Bone Meal, Steamed Bone Meal, Sheep and Goat Manure, Fish and Blood. We mine and sell all grades of Florida Pebble Phosphate Rock.

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Carteret, N. J.	Greensboro, N. C.	Port Hope, Ont. Can
Cayce, S. C.	Havana, Cuba	Savannah Ga
Chambly Canton,	Henderson, N. C-	Searsport, Maine
Quebec, Can.	Montgomery, Ala.	South Amboy, N. J.
Charleston, S. C.	Nat. Stockyards, Ill.	Spartanburg, S. C.
Cincinnatti, Ohio	Norfolk, Va.	

The AMERICAN AGRICULTURAL CHEMICAL Co.

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Carteret, N. J.	Greensboro, N. C.	National Stockyards, Ill.	Savannah, Ga.
Charleston, S. C.	Havana, Cuba	New York, N. Y.	Spartanburg, S. C.
Cincinnati, Ohio	Henderson, N. C.	Norfolk, Va.	Wilmington, N. C.
Cleveland, Ohio	Houlton, Me.	No. Weymouth, Mass.	

The American FERTILIZER

Vol. 112 JANUARY 7, 1950 No. 1

World Outlook for Food*

What Agronomy Can Contribute

By Vincent Sauchelli

Director of Agricultural Research, The Davison Chemical Corp., Baltimore, Md.

Can the people of the world raise enough food in the future to satisfy their needs?

Many scientists and statesmen say "No." William V. Vogt, author of that hair-raising book, "The Road to Survival," Fairfield Osborn, who wrote that frightening book, "Our Plundered Planet," Lord Boyd Orr, former director of the Food and Agriculture Organization of the United Nations, and our esteemed conservationist, H. H. Bennett, have almost frightened the American public out of its good sense by their grim predictions of world starvation. Others have taken the old Malthusian doctrine out of the moth balls and insist that the only cure is mass birth control among the prolific hordes of China, India and other densely populated lands. The more indifferent merely shrug their shoulders, saying some people have always been hungry in the world and so it will always be, so why worry.

Because of the remarkable development of nutritional science both here and in Europe we have become conspicuously food and nutrition conscious. A large proportion of educated people are now aware that it takes the right kinds of food to keep up health and vigor. Malnutrition is recognized as a decisive factor in making people less efficient, irrational, unstable and possibly even driving them to war on their neighbors.

There are three major avenues of approach to a solution of this problem. First, we can intensify production on present crop land. This is of immediate urgency because the half-starved people in the backward countries need help now. They cannot wait for the development of grandiose hydroelectric, irrigation and chemurgic projects. Second, we can extend the areas of food production into virgin territories hitherto passed by because of the difficulties involved. These are the leached forest soils of the north temperate zones and the lateritic soils of the semi-arid and wet regions of the tropic and subtropic zones. Third, we shall have to teach peoples in all areas how to reduce losses in topsoil and how to preserve foods by all the arts developed in recent years.

I believe the world can successfully work out its food problem in the near and in the distant future. This may sound naively optimistic to some and perhaps even presumptuous. From the viewpoint of agronomy, I say it can be done. My reasons follow.

I have a book titled "Calculus Made Easy." On the title page the author quotes a proverb: "What one fool can do, another can." I like to believe that is true. Applying that to this food problem, I am confident that other nationals, using the same or similar skills, organization and technologies that enabled American farmers to achieve their remarkable production in the recent war years, could

* An address before the Chemical Engineers Club, Washington, D.C. in a symposium on World Food Outlook, November 9, 1949.

produce food for at least double the present world population. Let me highlight the factors behind that record.

American Farm Record

An upward trend exists in American agriculture in the volume and per-acre output of farm production. The factors supporting the trend are many. Among them these stand out:

(1) The expanded use of powered equipment of all types which reduce the burden of human labor and hours of labor input per acre. Consider tractors: in 1920 the country had 246,000; in 1946, 2.5 millions.

(2) On American farms in 1920 the horse and mule population was 25.5 millions; in 1946, 9.1 millions—about 70 per cent less.

(3) Crop production per acre has steadily increased, averaging about 20 per cent higher during the war years than in the 1935–39 period. Crop land average has changed slightly in the period 1920–1946. In 1925, 44 million acres of cotton yielded 16 million bales; in 1949, 23 million acres produced about 15 million bales. Thus, with an almost 50 per cent cut in acreage, the crop was cut by about 8 per cent. In 1932 we used 110 million acres to produce a 2.7 billion bushel corn crop; in 1948 about 85 million acres produced the record crop of 3.65 billion bushels, about 25 per cent higher on 25 million fewer acres than in 1932.

(4) Powered machinery on the farm released over 55 million acres—almost 15 per cent of the total crop land formerly devoted to production of feed and hay for the horses and mules. These same machines stimulated enormous increases in acreage and production of new crops, like soybeans. The combine permitted soybean acreage to jump from a total of 4.9 million bushels in 1924 to 196.7 million in 1946.

(5) These stupendous crop production records could not be achieved nor long sustained without the liberal use of commercial fertilizers, lime and better soil management practices. In 1920 the total United States consumption of fertilizer was 7.2 million tons; in 1948, 17.5 million tons. Almost 40 million tons of lime and fertilizer were applied to our oils last year.

(6) Another significant factor in the record is the plant breeder. He has developed methods for selecting and integrating desirable genes to produce new varieties adapted to local soil-climatic complexes. To him we owe hybrid corn, POJ sugar cane and strains of wheat which can mature under 12 to 15 inches of annual rainfall as against an earlier limit of 18 inches, Clinton oats, Wong barley and so on.

(7) In this list of new factors in modern agriculture one cannot overlook the improvement in means and methods of controlling crop diseases and pests. More than 750,000 known kinds of insects and countless fungi and bacteria inhabit the earth, most of which are relentless enemies of man, his beasts and his food and fiber crops. Uncontrolled, the pests and diseases can limit the type and acreage of crops in any locality. In one year American farmers spend about 200 millions to control these crop diseases and pests.

(8) Then we have supplementary industrial developments better known as "chemurgic" which are of tremendous help in transforming agriculture from a social institution or way of life into a vast, agro-bio-chemical industry. For example, about 140 million bushels of corn and huge amounts of soybeans are used annually for industrial purposes.

These various factors integrated into our modern economy explain to a large extent the intricate, marvellous development supporting our steady production of foodstuffs and the enviably high-quality diet of the American public.

Now, how does this tie in wita the world food problem?

First, let me emphasize that feeding an increasing world population is not so much finding and developing soil and mineral resources as it is developing social institutions with the capacity and will to utilize effectively such resources and known technologies. No one denies the problem is terribly difficult. The soil and farming phases of the problem can be managed quite satisfactorily; but, not so manageable is the political phase.

Soil Resources

Food production starts with the soil. About 2.3 billion people now depend upon it for their food, fibre and feed. The soil seldom fails us. Of the world's total land area, estimated at 35.7 billion acreas, eleven billions are climatically suited for cultivation. Actually only about 8 to 10 per cent of this potential, or say about 4 billion are cultivated. About 85 per cent of what is cultivated is used for food production; the remainder for industrial crops.

On the basis of today's world population the land climatically suited for agriculture provides about five acres per person. The actual land being cultivated averages about 1.5 acres per person. With the population of the world increasing at the rate of about 20 million per year, how many of the remaining

climatically suited acres can be utilized for future needs?

The soil groups of the tropics, subtropics and temperate zones comprise a little over half (52 per cent) of the total land area of the world. Dr. Charles E. Kellogg[1] has estimated that one billion acres in the tropics of Africa and South America and some large islands could be developed for food production. The other promising areas, the vast forest soils, or podzols, of the north temperate zone in Europe and North America comprise about 300 million acres. Less than one per cent of these two great potential land areas is at present cultivated. So we can say, the soil resources of the world are ample for many generations to come.

Fertilizer Supplies

Among the cultural methods modern agriculture uses to increase production, fertilizers and lime are in the forefront. Most overworked soils are deficient in one or more plant nutrients. Asia and Africa must grow more food as soon as possible. About 60 per cent of the world's peoples live in those two continents and must depend upon their own resources since their populations do not emigrate. Experimental farms in India and Africa are getting at least twice the yield of neighboring peasant holdings. Asia is a wonderful field for fertilizer use. More nitrogen per unit area of rice land would yield more food than any single factor in the shortest possible time.

Well, does the world have sufficient fertilizer materials to satisfy the requirements? The three major nutrients required are nitrogen, phosphoric acid and potash. You recall my reference to the huge tonnages of fertilizers and lime American farmers use in one year.

Fortunately, an abundant supply does exist of all three nutrients in the form of raw materials. Nitrogen compounds suitable for plant feeding are now produced synthetically. About 80 per cent of the atmosphere comprises the raw nitrogen supply for this purpose. And we have Chilean nitrate, by-product coke oven sulphate of ammonia, and legumes and animal manures as additional sources. Hence, future supplies are limited only by manufacturing capacity and fuel resources. An estimated 166 billion metric tons phosphoric acid are available in known deposits of phosphate rock. And the known potash reserves are estimated at some 22.5 billion tons. Beside these, the oceans of the world represent vast storehouses of phosphorus, potassium and other plant nutrients. A cubic mile of ocean water contains the equivalent of about four million tons of sulphate of potash and about 2700 tons of 20 per cent superphosphate, not to mention magnesium and other plant nutrients.

Table 1, prepared by the U. S. Department of Agriculture, summarizes the annual requirements of mineral fertilizers under the proposed F.A.O. expansion of food production on the present and the potential 1–1/3 billion acres of Kellogg's estimate and the known reserves of major fertilizer materials.

TABLE 1.
WORLD ANNUAL REQUIREMENT OF FERTILIZER UNDER EXPANDED FOOD PRODUCTION (1)

Acreage	P_2O_5 metric tons	K_2O metric tons
On 1.94 billion acres existing crop land at rate of France (2)	13,425,000	9,970,000
On 1 billion acres new tropical soils	16,400,000	32,000,000
On 300 million acres of new soil outside tropical regions (3)	2,000,000	1,500,000
Total	31,825,000	43,470,000
Known world reserves	166 billion	22.5 billion
Supply estimated to last under expanded food goal	5200 years	500 years

(1) Data based on U.S.D.A. Misc. Pub. 593.
(2) Rate—17.1 Kg. P_2O_5 per hectare (15 lbs. per acre)
12.7 Kg. K_2O per hectare (11.4 lbs. per acre)
(3) Rate assumed as that now used in Hawaii—
41 Kg. P_2O_5 per hectare (37 lbs. per acre)
80 Kg. K_2O per hectare (72 lbs. per acre)

We can safely say then that raw materials for fertilizer manufacture exist in superabundant quantities to satisfy expansion of food acreages for any period about which we need concern ourselves.

Agricultural Development Factors

We must remember that the soil-climate complex of factors determines the agricultural use of a region. About the climate, not much can be done; but a great deal can be done about taming the soil. Much of the infertility of soils can be converted to productivity by modern skills and science. But the immediate problem, as I said previously, is to increase the productivity of the land already under cultivation. Two-thirds of the people in the world are farmers. Too large a percentage

[1] Chief, Soil Survey Div., U.S.D.A.

(Continued on page 24)

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Vol. 112 JANUARY 7, 1950 No. 1

Principal Articles in This Issue

Soil Conservation Service Report Urges Land Capability Inventory

Completion of detailed surveys to determine the capability and conservation needs of the nation's farms at the earliest possible date is urged by Chief H. H. Bennett in the 1949 fiscal-year report of the Soil Conservation Service.

His report to Secretary of Agriculture Charles F. Brannan pointed out that this information must be provided before an adequate conservation farming program can be planned or executed for any farm. Moreover, it is desirable for planning and carrying out other agricultural programs. Dr. Bennett mentioned, for example, that evaluation of lands for taxation or loans would be sounder and more equitable if made on the basis of their capability for production; that land capability could be used as the basis for sound procedure and beneficial adjustments in all types of agricultural credit or land tenure; and that it might well be used as a guide for the wise expansion of rural road building, rural electrification, "and the orderly development of other community enterprises, especially those planned for permanency."

Although nearly 500,000,000 acres already have been surveyed, the conservation head reported, requests from farmers' soil conservation districts for farm planning assistance has so taxed the Service that the soil conservation inventory work recently has not been able to move ahead as rapidly as it should. He noted that the country may not need as large production of certain crops for several years as the unprecedented production it had to have during World War II and immediate post-war years, and suggested: "hence we could have a breathing spell during which we could very well complete our soil conservation survey for the proper guidance of needed adjustments in land use and make many of the adjustments that are long overdue."

"Our soil conservation surveys have shown," the report explained, "that we are now cultivating many millions of acres that should go out of cultivation into permanent pasture or into quick-growing trees. This is important to the individual farmer, because it means efficiency in production and, in the long run, will mean a more stable income. And certainly it is of the utmost importance to the Nation as a whole. Even though our land is now capable of producing more than is in demand, this will not always be true if we continue to deplete our land resources while the demand for food and other agricultural products grows."

Chief Bennett also pointed to other means for speeding the soil and water conservation program, such as further development of conservation credit facilities.

"The solid results obtained from investments in conservation farming, in terms of increased income, prove that such investments usually pay for themselves and thus provide a basis for a sound extension of credit to finance them," his report said. "It seems desirable that appropriate steps be taken to broaden the credit structure to permit a more liberal use of credit for sound conservation operations and investments. Privately owned banking and credit institutions, as well as Government, should be encouraged to broaden their credit operations in this field. Some banks are doing this now and the tendency is increasing."

Woods Elected Director of Commercial Solvents Corp.

J. Albert Woods, president of Wilson & Toomer Fertilizer Company, Jacksonville, Florida, has been elected to the Board of Directors of Commercial Solvents Corporation, it has been announced by Major Theodore P. Walker, chairman of the board.

Mr. Woods was vice president and director of Armour Fertilizer Works from 1929 to 1934. He joined the Chilean Nitrate Sales Corporation in 1934 and became vice president and then president of that company. In 1945 he became vice president of W. R. Grace & Company.

In addition to being president, Mr. Woods is a director of Wilson & Toomer Fertilizer Company, which manufactures fertilizers, heavy chemicals, insecticides and fungicides. He is also Chairman of the Board of Southern States Bag Company; a director and member of the Executive Committee of the Barnett National Bank in Jacksonville, Fla.; Regent and Chairman of Finance Committee of the University of the South; and Director of the American Plant Food Council, Inc., located in Washington, D. C.

George A. Bratt, Sr. Celebrates 50th Anniversary with Griffith & Boyd Company

Friends, family and business associates of George A. Bratt, Sr., president of Griffith & Boyd Company, recently attended a luncheon at the Southern Hotel, Baltimore, in honor of his fiftieth year of service with his Company. Representatives from all of the Baltimore fertilizer manufacturers and others affiliated with the industry, including Dr. Russell Coleman, president of the National Fertilizer Association, Washington, D. C., were guests of J. E. Totman, president of the Summers Fertilizer Company, who gave the luncheon in honor of Mr. Batt's long uninterrupted service with his Company.

Griffith & Boyd is one of the oldest manufacturers in the industry dating back to 1887. Mr. Bratt joined them on December 26, 1899 as stenographer and clerk. In 1936 he became president, which position he has continuously held.

His host of friends paid tribute to his fine character and ability by presenting him with several appropriate gifts. In spite of his long tenure of office, he is not looking forward to retirement. He enjoys excellent health and is unusually vigorous for a man of his years.

Rhoden of Chase Bag Returns from Trip to India

Returning to New York from a six week on the spot observation of India's jute and burlap conditions affecting this country's supply, F. H. Rhoden, Chase Bag Company's manager of burlap purchasing, confirmed that previously reported confusion still exists.

Commenting briefly after a flight which took him around the world, Mr. Rhoden said the monetary disorder between the jute producing areas of Pakistan and the mills of Calcutta, brought about by the devaluation of English money, would continue to restrict free trading until settled.

As head of burlap purchases for Chase, Mr. Rhoden has made three trips to India in the interest of trade relations since the end of World War II. During the war he was chief of the Burlap and Soft Fibre Products Section of the War Production Board Civilian Production Administration in Washington and administrator of Burlap Conservation Order M-47.

N.F.A. Changes Address

On January 1st the name of the building in which are located the offices of the National Fertilizer Association, was changed from Investment Building to Continental Building. The new address of the association is now 616 Continental Building, Washington 5, D. C. There is no change in the telephone number which remains National 8624.

Arkell & Smiths Produces Ten-Billionth Paper Bag

At the recent celebration commemorating the 90th anniversary of the founding of Arkell & Smiths, bag manufacturers of Canojoharie, N. Y., the ten-billionth bag manufactured in that plant was presented by William Dittman, the oldest employee, to president S. S. Yates. The bag, which carried the Gold Medal Flour label was turned over to J. R. Murphy of General Mills, Inc., and will be added to the memorabilia collection of that company.

Nitrogen-Potassium and Phosphorus-Potassium Balance

The relationship between nitrogen and potassium is very important. The larger the amount of nitrogen available up to a certain point, the greater growth the plant is able to make. The more it grows, the greater is the demand from the soil for all other elements, but of these elements potassium seems to be in particular demand. Frequently a soil may have sufficient available potassium to satisfy a tree when grown under a certain nitrogen level, but if the nitrogen is raised beyond that level a deficiency of potassium may result which can only be corrected by further additions of that element. The amount of potassium required, therefore, is dependent to a large extent on the amount of available nitrogen. Thus the continuous use of a nitrogen-only fertilizer or a fertilizer high in nitrogen and low in potassium could easily lead to a deficient potassium condition.

Under commercial conditions the possibility of an excess of phosphorus is not so likely as an excess of nitrogen, but there are recorded instances of where excessively high phosphorus has brought about a deficient potassium condition. Since apple trees do not feed heavily on this element, the continuous use of large quantities of phosphoric fertilizers without the application of potassium is not to be recommended. On many acid soils, which are frequently low in available phosphorus, this element becomes so deficient that the soil is unable to support a satisfactory cover crop or grow a grass sod. Under such conditions the phosphorus deficiency should be corrected, both by correcting the acidity through the use of lime and by liberal applications of a phosphatic fertilizer, but the continuous applications of excessive lime or phosphorus could lead to serious difficulties. (*Tech. Bul. 65, Ottawa, Canada*).

Fertility Management in Maine Orchards

Most commercial orchardists in Maine, recognize the need of increased soil fertility in the orchard, have adopted some system of fertility management, according to M. F. Trevett and C. W. Hitz, Maine Crop Specialists. According to these authorities, successful fertility management should provide an adequate supply of tree nutrients and at the same time maintain or increase the soil organic matter. These conditions can be met most easily in the sod orchards of Maine by a system of balanced fertilization and tree mulching. Specifically, these authorities recommend: (1) Maintain a hay or straw mulch under the trees six inches deep, or at least deep enough to smother out most weeds and grasses; (2) annually apply under each tree one-third pound of nitrate of soda (or its equivalent) per year of age of the tree; (3) annually apply 500 to 700 lbs. of a 7–7–7 fertilizer between the rows; (4) apply magnesium limestone to the entire orchard floor whenever the need is indicated by soil tests; (5) watch the trees for hunger signs. (*Maine Ext. Bul. 381*).

FERTILIZER MATERIALS MARKET

NEW YORK

Continuation of Potash Strike Felt in All Branches of the Industry. Mixing Halted and Shipments of Superphosphate Held Up. Better Demand for Organics and Some Price Advances Noted. Castor Pomace Price Raised. No Change in Prices of Chemical Nitrogen or Superphosphate

Exclusive Correspondence to "The American Fertilizer"

New York, January 4, 1950

Sulphate of Ammonia

No price changes were noted but some fertilizer people seem to feel a reduction in the price should be made by the producers. However, supplies of coal on hand are not too heavy at the plants and with the reduced work week at the mines it was thought the production of by-product material might fall off.

Nitrate of Soda

Shipments were made in a limited way but most buyers preferred to wait to take in their material. No change in prices was made.

Nitrogenous Tankage

Some producers are sold out until April and material for quick shipment is hard to locate.

Castor Pomace

This market advanced $3.50 per ton and was quoted at $27.50 per ton, f.o.b. production points, with sales made on this basis for nearby shipment. Little material was offered, and after some sales were made on this basis the seller withdrew from the market.

Organics

Organics were in demand by both the fertilizer and feed trade and some price advances were noted. Tankage and blood advanced to $8.50 per unit of ammonia ($10.33 per unit N), f.o.b. Eastern shipping points, and supplies were not too plentiful. Both fertilizer and deed buyers were in the market. Vegetable meals maintained a steady tone with sales of soybean meal made at $56.00 per ton in bulk, f.o.b. Decatur, Ill. Cottonseed meal sold at $60.00 per ton, f.o.b. Southeastern points, for prompt shipment, and linseed meal sold on the basis of $70.00 per ton, f.o.b. Minneapolis.

Fish Meal

Outside of some foreign material that was offered at several Atlantic ports, little activity was noted in this material. Fertilizer buyers were not showing any interest on account of price and feed buyers considered fish meal too high compared with soybean meal and meat scraps.

Bone Meal

Fertilizer bone meal was in good demand and stocks were rather limited. There was also a better movement of feeding bone meal noted.

Hoof Meal

Several sales of this material were made on the basis of $7.50 per unit of ammonia ($9.12 per unit N), f.o.b. Chicago, and stocks are said to be well cleaned up at this figure.

Superphosphate

While no price changes were noted, the potash strike was definitely holding up shipping instructions for this material and the actual movement at the present time is small. Some change for the better was looked for after the first of the year.

Potash

With the strike still in force at three large producing plants, considerable production has been lost that cannot be made up. Fertilizer manufacturers in various sections are gradually being forced to curtail mixing operations, due to lack of potash. The situation is rather uneven as some people seem to have good stocks on hand and others have none. Very little imported material is being offered.

Conditioners

Low grade ammoniates such as garbage tankage, cocoa shells and tankage were in rather limited demand, because here again the potash strike was holding up the general movement of these materials. However, most producers are under long term contracts with the buyers.

CHARLESTON

Storage Space Crowded and Material Shipments Retarded Because of Potash Strike. Organics Market Tight. Chemical Nitrogen Adequate

Exclusive Correspondence to "The American Fertilizer"

CHARLESTON, January 3, 1950

Except for lower Southeastern areas, demand for fertilizers is relatively slack with manufacturers crowded for storage space. Potash at the moment, due to the current strike at the mines, is of serious concern to manufacturers throughout the country. Organic nitrogen materials are scarce.

Organics.—The organic ammoniate market continues tight and is likely to tighten further as it is reported that export restrictions on many organics have been lifted effective January, 1950. Blood and tankage continue at levels too high to interest many fertilizer manufacturers. Nitrogenous tankage producers are in a heavily sold position, the earliest supplies being available May, 1950. Prices vary from $3.75 to $4.00 per unit of ammonia, ($4.56 to $4.86 per unit N), f.o.b. domestic shipping point. Imported nitrogenous varies from $4.60 to $4.75 per unit of ammonia ($5.59 to $5.77 per unit N), in bags, c.i.f. Atlantic and Gulf ports depending on the shipment. Future material is not available until April.

Castor Pomace.—This market continues tight and nominally at $27.50 per ton in bags, f.o.b. Northeastern production points. Current movement is against contracts already made.

Dried Ground Blood.—This item is relatively quiet at around $8.00 per unit of ammonia ($9.72 per unit N), f.o.b. New York area. The Chicago market is $8.00 to $8.25 per unit of ammonia, ($9.72 to $10.02 per unit N).

Potash.—No new development in the strike situation at Carlsbad has been noted. The shortage of potash is beginning to reach serious proportions, particularly in the Southeast. Buyers are turning to other sources of potash, such as ground Cotter Bur Ash, for their immediate needs.

Ground Cotton Bur Ash.—This material has been enjoying a good sale recently at around 65 cents per unit of K_2O, in bulk, f.o.b. Texas shipping point for material testing 30 per cent to 40 per cent K_2O. Bagged cotton bur ash is reported selling at $1.75 per unit of K_2O, carload lots, delivered Northeastern destinations.

Phosphate Rock.—Domestic demand has decreased as a result of heavy stocks of superphosphate at acidulators plants

Superphosphate.—Production has been slowed down as a result of slow movement of fertilizers and also the influence of lack of potash for mixing purposes.

Sulphate of Ammonia.—October production is reported at approximately 20,000 tons of coke oven material which is considerably down from production during September. Prices remain approximately the same—$45.00 to $48.00 per ton in bulk for coke oven production.

Ammonium Nitrate.—The market continues competitive with supplies adequate to meet the demand.

Nitrate of Soda.—Supply position is comfortable and demand seasonal. No changes in prices have been noted recently.

PHILADELPHIA

Market Quiet but Disturbed by Prolonged Potash Strike. Some Relief through Foreign Potash in Sight. Feed Market Improved.

Exclusive Correspondence to "The American Fertilizer"

PHILADELPHIA, January 3, 1950

While organics show a trifle more strength, the general market is quiet and considerably disturbed by continuance of the potash strike. It is expected that shipment of mixtures will shortly begin to move with some activity and continue through the next several months.

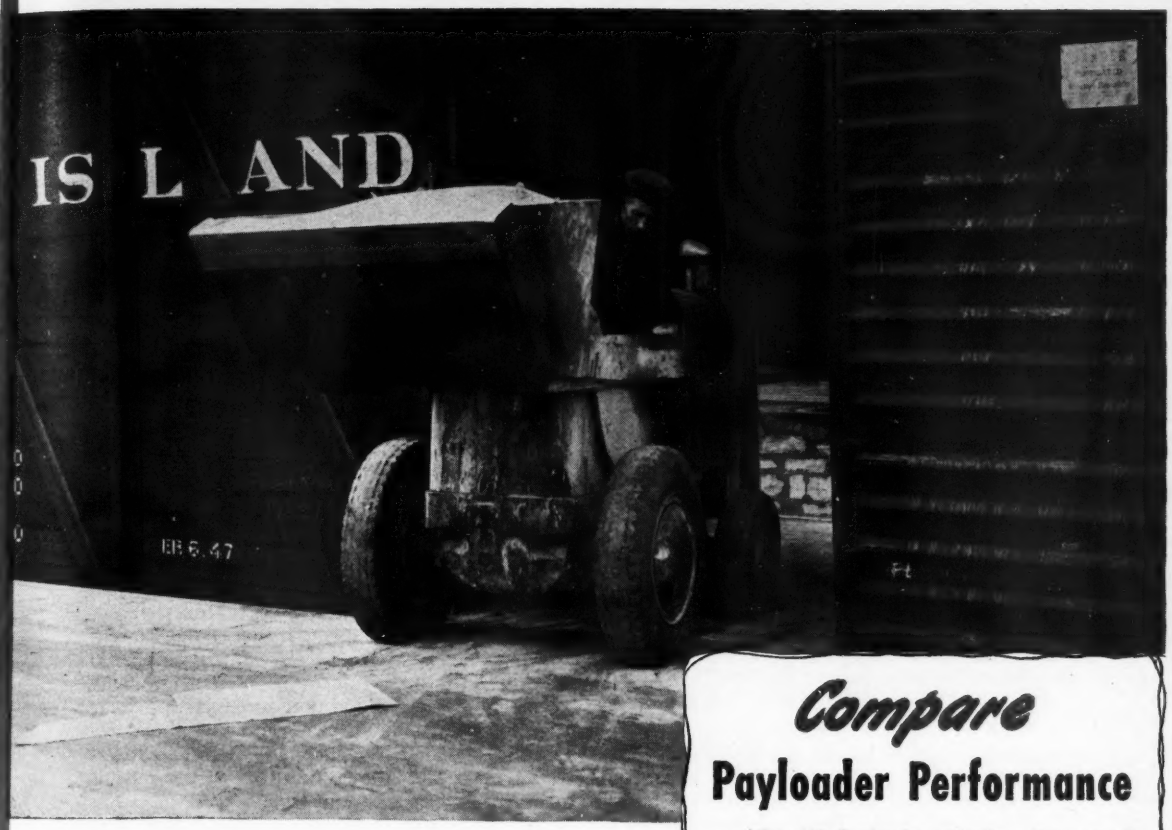
Sulphate of Ammonia.—Supply is quite ample to meet all domestic requirements but movement is considerably restricted through inability of fertilizer manufacturers to take deliveries due them. Part of the difficulty is reflected by the potash strike.

Nitrate of Soda.—Demand is limited to seasonal requirements and supplies of both domestic and imported are ample.

Blood, Tankage, Bone.—Feeding demand in the West has improved somewhat, giving strength to that market area. Blood is quoted in Chicago at $8.50 per unit of ammonia ($10.33 per unit N), but is nominal at $8.00 ($9.72 per unit N), in New York. Tankage stands at $8.25 ($10.02 per unit N), in the West, and $8.00 ($9.72 per unit N), in New York. Bone is rather steady at $65.00 per ton, with more interest being shown by the fertilizer people.

Castor Pomace.—Demand for this article is very active but buyers hesitate to pay the price necessary to obtain resale material, of which the supply is exceedingly limited. Production is entirely under contract and no offerings are being made by first hands.

How do you handle BULK Materials?



Are you equipped to scoop up, carry, lift and unload your bulk materials quickly and cheaply? Do you require expensive containers for your mass materials in transit? How much do you handle with each operation?

Hough Payloaders are designed and built primarily for the handling of loose materials—to provide a fast, flexible materials handling system . . . to cut time and costs . . . to boost output per manhour. Scoop up your loose materials in Payloader's even-keel bucket, move them without spilling in and out of box cars, through narrow aisle ways and through mud and soft ground if you wish. Dump your materials into hoppers, containers or bins—high or low, slow or fast—by fingertip-controlled hydraulic action.

The accompanying performance notes are only a few examples of how and why hundreds of plants are saving time and costs and boosting output per manhour with Payloaders. It will pay you to get the full Payloader story, too. The Frank G. Hough Co., 702 Sunnyside Avenue, Libertyville, Illinois.

Compare Payloader Performance

- ✓ One HA Payloader unloads a box car of superphosphate in 2½ hours, traveling 200 ft. round trip to the stockpile. Formerly took 5 men, 4 hours. Also saves 40 manhours per car unloading bagged ammonium nitrate.
- ✓ Two HA Payloaders unload a 50-ton box car of chemicals in 1½ hours. Formerly took 9 men, 4½ hours.
- ✓ Unloading box cars of chemicals, also hauling fertilizer 150 feet to mixer, one Model HA Payloader and operator does in one hour as much as 15 men working 5 hours.
- ✓ Model HA Payloader unloads box cars of phosphoric acid. Compared to previous method, it has cut unloading time in half and saves 88 manhours of labor per car.
- ✓ Traveling 200 feet round trip, carrying loose fertilizer from bins and dumping into bagging mills, four HA Payloaders handle 50 tons per hour—save 126 manhours per day.

SAY 'HUFF'

HOUGH PAYLOADER

Manufactured by THE FRANK G. HOUGH CO.

Fish Scrap.—Demand is exceedingly light with limited offerings at $170.00 per ton for menhaden meal.

Phosphate Rock.—Supply is sufficient to meet any current requirements, but large inventories at mixing plants are slowing up the movement of all materials, including phosphate rock.

Superphosphate.—Movement continues rather slow and the general situation is confused by the potash strike. No price changes are noted.

Potash.—The Carlsbad strike is still unsettled and the situation in some quarters is becoming serious. While several vessels are soon to arrive from Germany with about 8,000 tons of muriate and sulphate of potash, not much relief can be expected from this since the domestic production loss by the present strike is estimated to be several thousand tons daily.

CHICAGO

Price Advances on Organics Materials Sustained. Sellers Not Offering Very Far into the Future.

CHICAGO, January 3, 1949

The advances in prices on animal proteins recently established in this area have been sustained and while no further appreciable increase in price has been established thus far, the market is firm. Buying interest is not too aggressive and sellers are not showing any inclination to sell too far ahead; therefore, the supply and demand situation appears to be pretty well balanced. As long as this condition prevails, the market should remain fairly steady.

Ground and sacked meat scraps, 50 per cent protein, is moving at $105.00 per ton and digester tankage, 60 per cent protein, at $115.00 per ton, f.o.b. shipping points, in both cases. Dry rendered tankage is steady at $1.85 per unit of protein. Wet rendered tankage is offered at $8.50 per unit of ammonia ($10.33 per unit N), but last trading was at $8.25 ($10.02 per unit N) delivered for high testing material. Low test product is quoted about 50 cents per unit higher. Dried blood is moving in moderate quantities at $8.00 to $8.25 per unit of ammonia ($9.72 to $10.02 per unit N). Steamed bone meal is unchanged at $70.00 to $80.00 per ton and raw bone meal at $70.00 to $75.00 per ton.

Ware Reports Another Record Year International Minerals & Chemical Corp.

International Minerals & Chemical Corporation has just finished another record year of sales, production and profits according to a recent statement by President Louis Ware. One change in the marketing situation currently occurring is the delay by farmers in the purchase of plant food. They have returned to their pre-war pattern of taking delivery when needed in the spring rather than throughout the year. This is the result of increased availability of raw materials. Nitrogen which was short last year is now in easy supply, as is phosphate. There are still some shortages in potash which are being currently aggravated by a strike which has shut down 85 per cent of domestic potash production.

International's export of phosphate has increased substantially this year and they have been successful in expanding their potash sales to the export market and to the chemical manufacturers. Visits abroad to the consuming areas of phosphate and producing areas of potash indicate that their products are in a strong position as there will be continued exporting of phosphate and potash will probably be free from immediate intensive competition from imports of other countries.

The demand for the products of agriculture

continues strong. In this country a small portion of the crop production where unusually good crops have been reaped this year will next year be placed under acreage control by the Department of Agriculture. Although farm prices have declined somewhat during the past year, the farmer is still obtaining favorable prices for his products and has continued to increase his savings and decrease his debt. The Congress passed favorable price supports on major crops and the outlook for the sales of materials to the farmer continues good.

The management of International feels that the business situation is sound and is making plans for continued reasonable expansion during the next few years.

Urea-form Offers Promise as Nitrogen Source for Tobacco

Urea-form, a new chemical compounded of urea and formaldehyde, offers much promise as a source of nitrogen for tobacco fertilization, according to T. R. Swanback, agronomist at the Windsor Tobacco Laboratory of the Connecticut Agricultural Experiment Station. Mr. Swanback has been conducting experiments with the material for the past two years and finds that its use in combination with cottonseed meal results in 16 to 23 per cent increase in grading and yield over cottonseed meal alone. Cottonseed meal is the material now used most commonly by growers for nitrogen supply.

Urea without formaldehyde has been used by growers to some extent for several years. The combination material, however, has an advantage over urea alone because its nitrifying action is slower. Urea releases too much ammonia too soon. This affects tobacco adversely, producing too much dark color in the leaf. Urea-form, producing ammonia more slowly, does not have this effect. In fact, even in comparison with cottonseed meal, four per cent less dark leaf color was produced with the urea-form-cottonseed meal treatment in Mr. Swanback's experiments.

Mr. Swanback found that the treatment giving best crop value (yield plus grading) was a mixture of 25 per cent urea-form and 75 per cent cottonseed meal. Thus far, urea-form has been available for experimental purposes only. Mr. Swanback expects it to be on the market in 1950 or 1951. It will sell at a lower price than nitrogen in cottonseed meal.

The urea-form used in Mr. Swanback's experiments was obtained from the U. S. Department of Agriculture, Bureau of Plant Industry Station in Beltsville, Md.

IT'S **LION** FOR ONE-STOP SERVICE

for nitrogen

Lion's recently expanded Chemical Division is now ready to supply all your nitrogen requirements!

LION Anhydrous Ammonia

Use of this material for direct application to the soil has been proved to be both economical and highly efficient in crop production. Accurate chemical control throughout the process of manufacture assures uniformity and high quality in this basic Lion product. Aqua Ammonia, now being used in certain areas for direct application, is also available.

LION Nitrogen Fertilizer Solutions

Made specifically for the manufacturing of mixed goods. This product supplies both ammonia nitrogen and nitrate nitrogen in desirable ratios. Easily handled, and available in three types, designed for varying weather conditions and formula requirements, for the production of fertilizers that cure rapidly, store well and drill efficiently.

LION Ammonium Nitrate Fertilizer

In great demand because of its low unit cost (33.5% guaranteed minimum nitrogen) and superior qualities. The improved spherical white pellets are freer flowing and have increased resistance to caking, with better storing qualities.

LION Sulphate of Ammonia

Use of this material enables the manufacturer to produce the high-analysis mixed fertilizers which are increasingly in demand by farmers. In the form of large white crystals which flow freely and resist caking in storage. Shipped in bulk and in 100-pound bags.

Technical advice and assistance to fertilizer manufacturers in solving their manufacturing problems is available for the asking. Just write:

"Serving Southern States"

LION OIL COMPANY
Chemical Division
EL DORADO, ARKANSAS

This advertisement will appear in the current issues of American Fertilizer and Commercial Fertilizer.

Army To Shut Down Its Fertilizer Nitrogen Plants

The U. S. Army has announced that it is ending its fertilizer nitrogen program and will close down its eight anhydrous ammonia plants by April. The announcement stated that the program was being terminated because private fertilizer manufacturers now are in position to supply the army's needs without jeopardizing necessary supplies to the farmer.

Closing of the fertilizer producing plants results from a material drop in the need for export of fertilizer to Japan and Korea, the army stated. By June 30th, both countries are expected to be able to fill all their needs in this regard from commercial sources. Germany became self-sufficient in this respect approximately one year ago.

Manufacture of nitrogenous fertilizer was initiated by the army in October, 1946, after it had been unable to obtain any considerable amount for use in occupied areas. Shipments of fertilizer were then vitally needed to restore agricultural production in occupied areas, to reduce the need for sending food from the United States, and to provide self-help for peoples in the occupied countries.

Production was started at army ordnance plants so as to supply the current need and in order to prevent excessive drain on commercial production in this country, which was then having difficulty in supplying its own needs. It is now anticipated that private plants can fill any future needs the army may have for nitrogenous fertilizers.

Facilities to be closed early in February include Ravenna Arsenal, Apco, Ohio; Iowa Ordnance plant, Burlington, Iowa; Joliet Arsenal, Joliet, Ill. Facilities scheduled to close in April include the Indiana Arsenal, Charlestown, Ind.; Illinois Ordnance Works, Carbondale, Ill.; San Jacinto Ammonia Works, Houston, Tex.; the Ohio River Ordnance Works, Henderson, Ky.; and the Morgantown Ordnance Works, Morgantown, W. Va. It may be necessary to continue Morgantown in operation for a short period after April to satisfy small remaining requirements for anhydrous ammonia. The fertilizer facilities at the Nebraska Ordnance Plant, Wahoo, Neb., were closed last month.

The Ohio River Ordinance Works will be offered for sale. The facilities at the Illinois Ordnance Works will revert to the Department of the Interior. Other plants to be closed will be retained by the army as standby facilities but will be made available for leasing for commercial purposes

Gulf Fertilizer Elects Officers

The Board of Directors of the Gulf Fertilizer Company, Tampa, Fla., has announced changes in the officers of the Company, following the death on October 18th of President L. R. Woods. L. P. Woods, formerly Vice-President and Secretary, is now Chairman of the Board. F. J. Woods, formerly Vice-President and Treasurer, has been advanced to President and Treasurer. G. D. Chamberlain was elected Vice-President and Secretary.

Summers Fertilizer Officials Honored in Maine

James C. Totman, Assistant Treasurer of the Summers Fertilizer Company, was recently elected for a three-year term to the Bangor, Maine City Council in a non-partisan contest involving fourteen aspirants. Mr. Totman is also Assistant Manager of Summers' Bangor, Maine office.

In addition, Governor Payne of Maine recently announced the appointment of Frank H. Totman of Houlton, Maine, associated with Summers Fertilizer Company, to Maine's Racing Commission.

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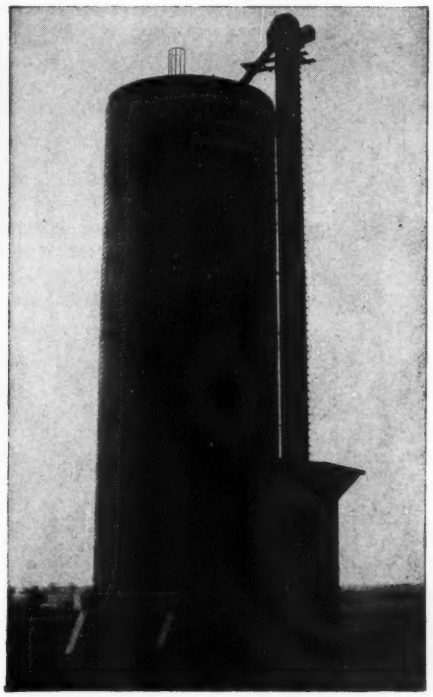
Fertilizer Handling Equipment



DESIGNED TO INCREASE YOUR EFFICIENCY. Store in bulk . . . deliver in bulk—eliminate bagging. The bulk storage plant cuts handling costs . . . makes you more money. The Baughman Belt and Bucket Elevator is the mark of an efficient bulk plant. **MASS-PRODUCED TO SAVE YOU MONEY.** Easily assembled from standard 10′ sections economically produced by assembly line methods. No costly custom-built installation required. Ruggedly built of high tensile alloy steel.

*CUSTOMIZED—designed for the job. These Baughman products are specially built for commercial fertilizer operations.

SPREADER FOR COMMERCIAL OPERATORS

This Baughman Self-Unloading Body is a money-maker Phosphate Spreader attachment spreads 16½′ widths . . covers 2 acres per mile at 15 mph. Easily detached, permitting use of body for spreading lime, unloading and spreading road rock, delivering coal and grain—all kinds of specialized profitable jobs.

BAUGHMAN SCREW CONVEYORS

Load and unload cars and trucks quickly and efficiently. Large capacity 9″ conveyor screw easily handles dry powdered lime, phosphate, commercial fertilizers—up to 40 bushels per minute. Top performance from the horizontal to 50°. Available with or without wheels. Ruggedly built of high tensile alloy steel. Direct line shaft drive. Gasoline or electric power.

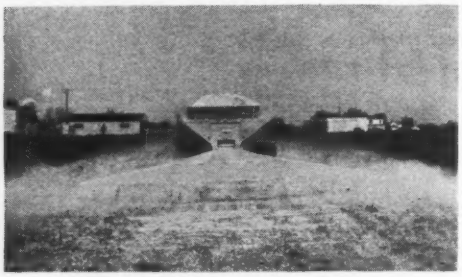
BAUGHMAN
HI-SPEED SPREADING AND CONVEYING EQUIPMENT
AROUND THE WORLD

BAUGHMAN MANUFACTURING CO., Inc.
700 Shipman Rd., JERSEYVILLE, ILL.
"There is a Baughman Distributor Near You"

Baughman Introduces New Fertilizer Sprayer Attachment

A revolutionary, new fertilizer sprayer attachment for their Model "K" and "K-2" bodies has been introduced by the Baughman Manufacturing Co., Inc., Jerseyville, Illinois.

The attachment, designated as Model 235, prevents the wind and air from getting to the material being thrown by the distributor, confines the usual airblast created by the whirling distributor and directs it through a tapered fanshaped "direction controlling" cover, spraying the material outward and



Baughman Sprayer Attachment

downward to the ground. Both fine and coarse particles are evenly distributed throughout the entire area. There is minimum waste in handling expensive and difficult materials.

With the new attachment, limestone can be sprayed approximately 30 feet, and ordinary fertilizer such as phosphate, approximately 20 feet.

The attachment folds easily and solidly to less than eight feet for highway travel.

November Sulphate of Ammonia

The end of the steel strike during November resulted in an increase of more than 100 per cent over October in the production of by-product sulphate of ammonia, according to the figures of the U. S. Bureau of Mines. The output of 44,025 tons was still far behind the figure of 70,840 tons for November, 1948, which is the normal production level over the past year. For the first 11 months of 1949, a tonnage of 687,282 was reported, which is about 70,000 tons under the same period of 1948.

Production in by-product plants from purchased synthetic ammonia continues to increase and production from this source is almost double that of the preceding year.

Stock on hand on November 31st were about 70 per eent higher than on the same date in 1948.

	Sulphate of Ammonia From By-Prod. Ammonia	Purchased Synthetic	Ammonia Liquor
Production	Tons	Tons	Tons NH_3
November, 1949..	44,025	5,912	1,355
October, 1949....	20,252	5,241	1,177
November, 1948..	70,840	3,015	2,068
Jan.-Nov. 1949...	687,282	52,093	20,710
Jan.-Nov., 1948..	756,486	27,075	22,620
Shipments			
November, 1949..	45,256	5,912	882
October, 1949....	16,046	5,226	863
November, 1948..	67,333	2,906	1,947
Stocks on Hand			
Nov. 30, 1949....	47,459	——	888
Oct. 31, 1949....	48,852	——	744
Nov. 30, 1949....	28,040	——	542

Fertilizer Committee of Congress Urges Action in Potash Strike

The Fertilizer Subcommittee of the House Committee on Agriculture has urged Secretary of Agriculture Charles Brannan to use his best endeavors to end the strike which has tied up the potash mines at Carlsbad, New Mexico, since November 19, 1949.

The strike was discussed by the committee at a closed meeting on January 5, where it was agreed to send a letter to Secretary Brannan urging that he stress to the National Labor Relations Board the importance of potash in farming operations and the importance of this particular source of supply, and asking that the board seek a prompt settlement of the dispute.

The NLRB is reported to have considered intervening in the strike several weeks ago, but decided against it at that time because it did not feel that the strike had progressed to a point where it was of sufficient national importance. The fertilizer committee feels otherwise, however, and in its letter to Secretary Brannan it was pointed out that Carlsbad

is the source of approximately 85 per cent of the potash supply for agriculture. The closing down of operations, it was further pointed out, has seriously interfered with operations of many small mixers because they had not accumulated sufficient stocks beforehand to continue normal mixing operations.

Wisconsin Announces Grassland Contest

A grassland farming contest for 1950, to bring to public attention the need for better grass in raising an abundance of low-cost livestock feed, was announced at the recent conference of agricultural extension workers in Madison, Wis. Open to every farmer in Wisconsin, the contest will be directed by the grassland farming committee of the University and is sponsored in cooperation with other educational agencies and commercial organizations. F. V. Burcalow is general chairman.

The State has been divided into seven areas, depending on major soil types. Area and State winners, in both the farmer classes and the county divisions, will receive special recognition at the end of the year. The Wisconsin contest is patterned after the green pastures contest of New England and will be repeated in 1951.

WORLD OUTLOOK FOR FOOD

(Continued from page 9)

are making only 10 per cent to 15 per cent of a poor living on overworked, too dry or too wet, sick, wounded, starved soils, using poor strains of crops and livestock, against unnecessary hazards of disease and pests, and working with obsolete hand tools and methods. These farmers themselves are badly nourished and whole families are weak and inefficient from preventable diseases which reduce their labor output. The appalling poverty and ignorance of so large a part of the world is undoubtedly one of the root-causes of the turmoil and rumors of war current in the world today.

Diet Goals

We should know what food goals are being considered. The Food and Agriculture Organization of the United Nations established a standard diet of 3000 calories as the optimum daily energy needs of the average adult person. These calories are distributed among fats, carbohydrates and proteins. Such a diet is common in the United States; in fact, the average in 1946 even exceeded it, particularly with respect to minerals, vitamins and essential amino acids. It is a luxurious diet. If the entire world was fed as the average American is, present food production could provide for only about one-third of the population.

Nearly two-thirds of the world's people live on diets composed chiefly of carbohydrates, that is cereals and potatoes. Such a diet would have to be supplemented by fruits, vegetables, eggs, meat, and oils to approach the average American diet.

The F.A.O. has estimated that in order to reach its diet goals by 1960 the important food classes would have to be increased as follows above pre-war levels[2]:

Cereals	21%
Roots and tubers	27%
Sugar	12%
Fats and oils	34%
Pulses and nuts	80%
Fruits and vegetables	163%
Meats	46%
Milk	100%

Such goals are attainable if farmers are given the know-how and the show-how of modern agricultural technology. The U. S. Department of Agriculture has recorded that production of food crops in our country during the recent war was maintained at a 35 per cent increase above the pre-war 1935–39 period. They also estimate that it is possible to continue to increase production under favorable conditions at the following rates:

Corn	31%
Wheat	18%
Rice	13%
Peanuts	20%
Sugar beets	17%
Potatoes	22%
Sweet potatoes	31%
Hay	28%

[2] R. M. Salter, Chief, A.R.A., U.S.D.A.

Table 2, developed by the U. S. Department of Agriculture[3], shows the world food supply attainable by 1960. In its preparation the authors used the probable increase in world production of the eight principal classes of food, applying to each class the percentage increase considered attainable for each crop. by 1950. They also assumed that new farm skills and technologies will be used intensively on present crop land to meet the world requirements of food established by the F.A.O. estimates for the year 1960.

By farming present crop lands much more intensively, most of the essential food could be met by 1960 with the exception of meat, milk and fruits and vegetables, the luxury crops. Undoubtedly higher increases could be realized by a strenuous effort to show farmers in the more backward countries how to apply simple improvements in production and distribution methods.

Protein

Nutritionists point out that a high quality diet is contingent upon sources of animal protein foods. Meat, milk, fish, eggs, cheese-these are the main items of this class. Part of their health-giving value lies in their protein, part in their high vitamin and mineral content. It takes a lot of arable land to produce these items, which explains their high cost, no doubt. But it also means large areas of grass-legume sod which protect soils. Consider the following table (Table 3) which summarizes the relative amounts of land to produce a unit of calories for different food items.

Protein is without question the bottleneck in a high quality diet. People forced to exist on a high cereal or carbohydrate diet com-

[3] R M. Salter, Chief, A.R.A., U.S.D.A.

TABLE 3.

AMOUNT OF LAND REQUIRED TO PRODUCE ONE MILLION CALORIES

Source: F. J. Stare, Atlantic Monthly, Jan. 1948

	Acres
Sugar	0.15
Potatoes	0.44
Corn, as meal	0.9
Wheat, as refined flour	1.2
Hogs (pork and lard)	2.0
Whole milk	2.8
Chickens	9.3
Steers	17.0

TABLE 2.

PRE-WAR FOOD PRODUCTION AND INCREASES ATTAINABLE FROM MORE INTENSIVE USE OF PRESENT CROP LAND. (1)

	Cereals	Roots & Tubers(2)	Sugar	Fats & Oils	Pulses & Nuts	Fruits & Vege-tables (3)	Meat	Milk
	(Millions of metric tons)							
Pre-war production	300.3	153.2	30.0	15.2	36.2	156.3	65.6	150.2
Increase attainable from present land (U.S.D.A. estimates)	20%	50%	15%	20%	20%	35%	20%	20%
Attainable production from present crop land	360.0	230.0	34.5	18.0	43.4	211.0	78.7	180.2
World food needs in 1960 (F.A.O. estimates)	363.5	194.5	33.6	20.4	65.2	411.0	95.8	300.0

(1) For 70 countries including 90 per cent of world population. World consumption of each class of food as given by "World Food Survey" of F.A.O., assumed to equal world production.
(2) Include Bananas.
(3) Include eggs and fish.

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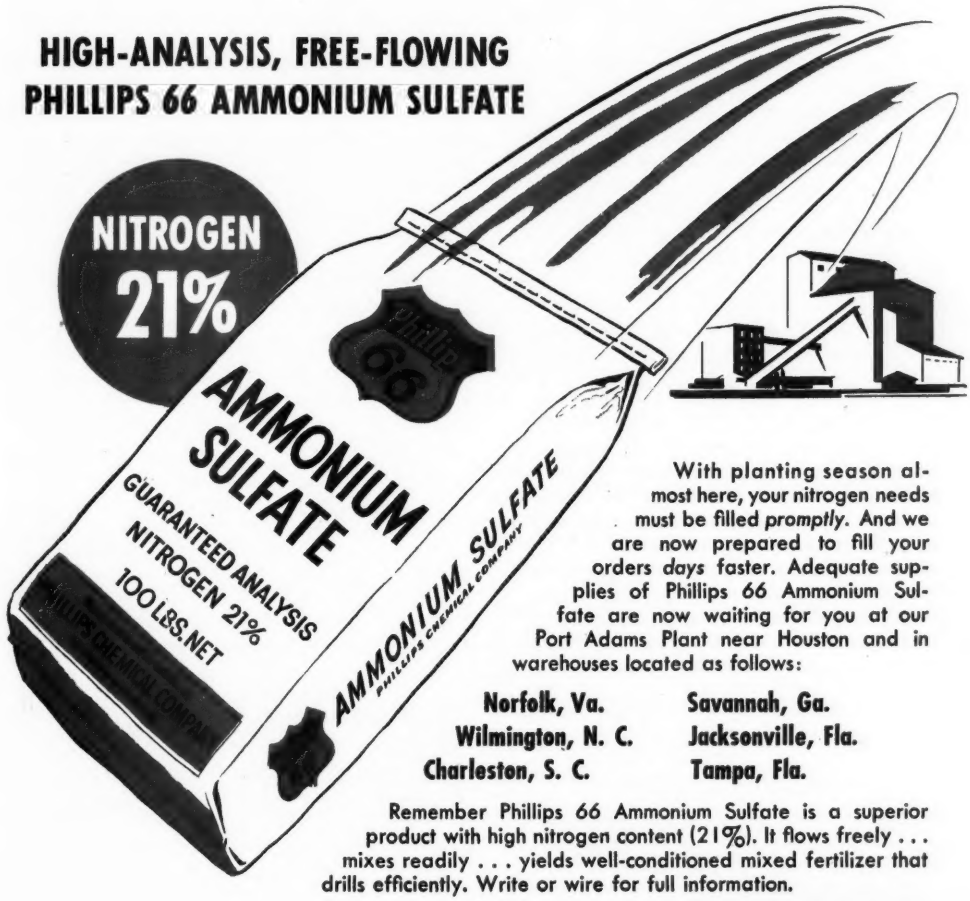
HIGH-ANALYSIS, FREE-FLOWING
PHILLIPS 66 AMMONIUM SULFATE



With planting season almost here, your nitrogen needs must be filled *promptly*. And we are now prepared to fill your orders *days* faster. Adequate supplies of Phillips 66 Ammonium Sulfate are now waiting for you at our Port Adams Plant near Houston and in warehouses located as follows:

Norfolk, Va. — **Savannah, Ga.**
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Charleston, S. C. — **Tampa, Fla.**

Remember Phillips 66 Ammonium Sulfate is a superior product with high nitrogen content (21%). It flows freely . . . mixes readily . . . yields well-conditioned mixed fertilizer that drills efficiently. Write or wire for full information.

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Phillips 66

prise the malnourished, restless, irrational half of mankind. Some practical method is needed to produce more desirable proteins without the use of excessive land areas. Is there any prospect?

Recently we have heard of the discovery of vitamin B-12, the so-called APF or "animal protein factor." This remarkable compound enhances the animal body's capacity to make better use of vegetable protein. If, as now seems possible, biochemists can produce it cheaply through bacterial fermentation processes, the whole world will benefit. It will make possible a more efficient use of low-cost vegetable proteins in animal feeding and release land for other crop uses.

Another possible factor in producing more protein at low cost must be mentioned. It is protein from yeasts. Remember the sugar item in Table 3—lowest land requirement: One acre of sugar cane of the POJ 2878 strain can yield from 75 to as high as 147 tons of millable stalks from which can be derived about 15 tons to about 29 tons respectively of sugar or substances convertible into sugars. Tropical soils, well fertilized and irrigated, can grow this crop.

Biochemists working with yeasts and sugars in this country and in Europe have obtained true proteins with as high a nutritive value as that of beef. This is now a well established fact. Dr. O. W. Willcox, an authority on sugar problems, has published figures to show that from 75 tons of millable stalks of cane—a one-acre yield—it is possible to obtain about 14,000 pounds of yeast protein. This is an amount sufficient to satisfy the annual protein ration of each of 267 persons. One acre of land, plus high-yielding sugar cane, fertilized and irrigated, yielding a potential amount of protein by the yeast process for 267 people! Compare this with one acre of wheat, giving an average of 20 bushels, which produces protein enough for only three persons

Food yeast must be in the future picture of world food resources. To produce the sugar cane juice necessary for supplying protein to the increasing numbers of people beyond 1960, only a relatively small part of the billion acres in the subtropic and tropic regions would be needed. Dr. Willcox suggests 8 to 10 million acres. Food yeast offers attractive possibilities of becoming a diet staple in many countries in the not too distant future.

General Summary

The over-all problem of world hunger is one of the most difficult we face; but it can be worked out. The world has always faced hunger. It has been shown we have the skills and technologies, the raw plant food resources, and the land—the elements needed to solve the problem. The problem now is more that of mobilizing world cooperation, dispelling the clouds of pessimism, and starting at once to intensify production on land already under cultivation. Important present limitations to food production in the world are that we are utilizing only 7 to 10 per cent of the earth's surface; that domesticated animals can convert only 10 to 25 per cent of the food they consume into food fit for humans. On the credit side are these items: we know how to restore depletion of soil fertility by chemical fertilizers and how to conserve topsoil; we have skills and technologies with which to organize future agriculture to higher levels of efficiency and to breed plants adapted to local soil-climate complexes. We have the means and the know-how. The F.A.O. is a great step forward in world cooperation to solve this problem; its job is to organize the "show-how," to teach backward peoples how to farm at higher levels of efficiency.

Nehru, Prime Minister of India, recently said at Columbia University: "The basic problem of the East is to obtain the necessaries of life. If they are lacking, there is the apathy of despair or the destructive rage of the revolutionary."

Hunger is a terrible force and in desperation starving masses will plunder and make war. But history shows that ghastly wars do not solve the problem. There is no real hope for increasing the happiness and well-being of any people in war or in political policy.

The only hope is in Science, in the laboratory and in the hearts of men of good will. Science and a high level of morality. Man is beginning to learn that he does not have to live miserably at the mercy of nature. Science has shown him how by cooperating with nature he can utilize her vast forces to multiply his puny muscles and harness the elements of the earth to work for his benefit. Want and war are inseparable. The laboratory will pay better dividends than the plunder and loot gotten by the sword, Science alone offers the hope of peace, food and the way to abundance and happiness to those in the world who are willing to learn and to work.

Acknowledgements

I want to thank Dr. R. M. Salter of the U.S.D.A. and the U.S.D.A. Bureau of Economics for their kindness in furnishing me statistical material used in this presentation.

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Scar-Lipman & Co., New York City
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A Classified Index to Advertisers in "The American Fertilizer"

BUYERS' GUIDE

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- Atlanta Utility Works, The, East Point, Ga.
- Sackett & Sons Co., The A. J., Baltimore ,Md.
- Stedman Foundry and Mach. Works, Aurora, Ind.
- Sturtevant Mill Company, Boston, Mass.

IMPORTERS, EXPORTERS
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- Southern Lead Burning Co., Atlanta, Ga.

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- Ashcraft-Wilkinson Co., Atlanta, Ga.
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- National Lime & Stone Co., Findlay, Ohio

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MACHINERY—Acid Making and Handling
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- Stedman Foundry and Mach. Works, Aurora, Ind.

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- Jackle, Frank R., New York City
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- Scar-Lipman & Co., New York City

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- American Potash and Chemical Corp., New York City
- Potash Co. of America, New York City
- International Minerals & Chemical Corporation, Chicago, Ill
- United States Potash Co., New York City

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- Schmutz Mfg. Co., Louisville, Ky.

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SPRAYS—Acid Chambers
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Huber & Company, New York City
Jackle, Frank R., New York City
Lion Oil Co., El Dorado, Ark.
McIver & Son, Alex. M., Charleston, S. C.
Phillips Chemical Co., Bartlesville, Okla.
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Woodward & Dickerson, Inc., Philadelphia, Pa.
Woodward Iron Company, Woodward, Ala.

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Texas Gulf Sulphur Co. New York City

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Ashcraft-Wilkinson Co., Atlanta, Ga.
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Huber & Company, New York City
International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Southern States Phosphate Fertilizer Co., Savannah, Ga.
U.S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Virginia-Carolina Chemical Corp., Richmond, Va.

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Ashcraft-Wilkinson Co., Atlanta, Ga.
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Davison Chemical Corporation, Baltimore, Md.
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International Minerals & Chemical Corporation, Chicago, Ill.
Jackle, Frank R., New York City
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Southern States Phosphate Fertilizer Co., Savannah, Ga.
U.S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Virginia-Carolina Chemical Corp., Richmond, Va.

SUPERPHOSPHATE—Concentrated
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Virginia-Carolina Chemical Corp., Richmond, Va.

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Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City
Davidson Commission Co., The, Chicago, Ill.
International Minerals & Chemical Corporation, Chicago, Ill.
Jackle, Frank R., New York City
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Alphabetical List of Advertisers

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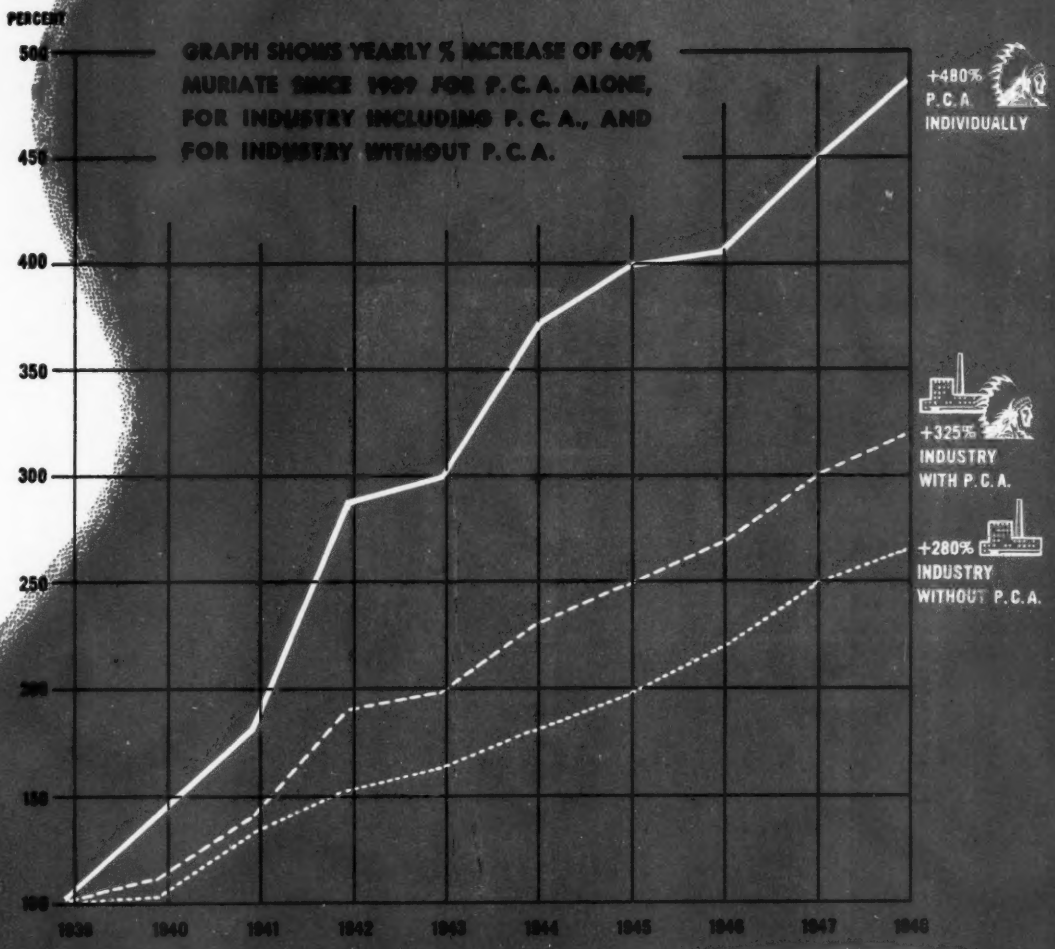

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